Info-Hams Digest   Sun, 12 Sep 93   Volume 93 : Issue 1084

Today's Topics:
                    DSP filters as tone decoders ?
                           HDN Releases
               Help: checking audio output on R1000
                    Radio Shack HTX-404 Reports ?
    RFC: Re: Daily Solar Geophysical Data Broadcast for 07 September
                      transmitter health hazards
                          TS450S for Sale
                University Amateur Radio Club Net

We trust that readers are intelligent enough to realize that all text
herein consists of personal comments and does not represent the official
policies or positions of any party. Your mileage may vary. So there.

Date: Wed, 8 Sep 1993 22:10:31 +0000
From: pipex!uknet!warwick!qmw-dcs!qmw!demon!llondel.demon.co.uk!dave@uunet.uu.net
Subject: DSP filters as tone decoders ?
To: info-hams@ucsd.edu

In article <9309080921.utk1103@FAB8.intel.com> RHAREL@FAB8.INTel.COM (RICHARD
HAREL) writes:
>Anyone out there seen code written to allow
>a DSP filter to be used as a tone decoder ?
>i.e. - DTMF, CTCSS, PBX signals, etc ?
>I would think since all of these tones are easily correlated,
>it could be done.
>An application I'm thinking of is to have the filter
>open the speaker terminals ONLY when a specific
>tone or series of tones are heard. Could be

>interseting on CW as well.
>Any comments/ideas ?

Analog Devices do a good book, based on the ADSP2100 series of chips which
go into great detail on how to do a DTMF decoder. It is possible to improve
on what they did (I know, cos I have done so) but it gives listings (in
ADSP2101 assembly language) showing how it is done, plus a good explanantion
of the maths behind it. I haven't got the book here so I can't give you the
title, but I believe it is the one which is an amalgamation of various
application notes.

Basically, for a discrete tone your best bet is a DFT (Discrete Fourier
Transform) which can be achieved by means of a thing called a Goertzel Algorithm
in an efficient manner (as described in the book). The narrower the bandwidth
you require, the longer the algorithm takes. As an idea, my DTMF decoder
program takes just over 25ms to do the DFTs required (sampling at 8kHz).

Dave
--

****
* G4WRW @ GB7WRW.#41.GBR.EU AX25   *   Start at the beginning. Go on   *
* dave@llondel.demon.co.uk Internet *   until the end. Then stop.   *
* g4wrw@g4wrw.ampr.org   Amprnet   *   (the king to the white rabbit) *
****

The following files were processed Saturday 09-11-93 at 1:124/7009:

HAMLOG   [HAM: Amateur radio logging programs]

HLOG220.EXE (328477 bytes) HyperLog V2.20 Logging Program

          328477 bytes in 1 file(s)

HAMNEWS   [HAM: Bulletins and Newsletters]

ARLP036.LZH (1046 bytes) ARRL Propagation Bulletin 09/10/93

                1046 bytes in 1 file(s)

HAMSAT   [HAM: Satellite tracking and finding programs]

SPC0913.LZH (3225 bytes) SPACE Bulletin 09/13/93

                3225 bytes in 1 file(s)

 Total of 332748 bytes in 3 file(s)

Files are available via Anonymous-FTP from ftp.fidonet.org

    Directories are:
        pub/fidonet/ham/hamnews (Bulletins)
                        /hamant   (Antennas)
                        /hamsat   (Sat. prg/Amsat Bulletins)
                        /hampack (Packet)
                        /hamelec (Formulas)
                        /hamtrain (Training Material)
                        /hamlog   (Logging Programs)
                        /hamcomm (APLink/JvFax/Rtty/etc)
                        /hammods (Equip modification)
                        /hamswl   (SWBC Skeds/Frequencies)
                        /hamscan (Scanner Frequencies)
                        /hamutil (Operating aids/utils)
                        /hamsrc   (Source code to programs)
                        /hamdemo (Demos of new ham software)
                        /hamnos   (TCP/IP and NOS related software)

lee - wa5eha
Ham Distribution Net
 * Origin: Ham Distribution Net Coordinator / Node 1 (1:124/7009)

Date: Sun, 12 Sep 1993 19:26:38 GMT
From: swrinde!cs.utexas.edu!math.ohio-state.edu!howland.reston.ans.net!
newsserver.jvnc.net!yale.edu!cs.yale.edu!csusys.ctstateu.edu!
white@network.ucsd.edu
Subject: Help: checking audio output on R1000
To: info-hams@ucsd.edu

How can I check the RECORD output of my Kenwood R1000 comm rcvr to see if the
problem that I have been having with the HamComm interface is an audio
output problem?
It works OK for listening, taping, etc (as does the external speaker line)
but perhaps the output voltage or ???? is too low to get the HC interface
to provide a signal > 150Hz....
Thanks
Harry
white@csusys.ctstateu.edu

Date: Sun, 12 Sep 1993 14:55:43 GMT
From: gsm001!gsm001.mendelson.com!gsmlrn@uunet.uu.net
Subject: Radio Shack HTX-404 Reports ?
To: info-hams@ucsd.edu

In article <930910201417.2a3c@MAR65.MAR.ORA.FDA.GOV>
          ODONNELLP@MAR65.MAR.ORA.FDA.GOV (Paul WB2OYC) writes:

>Radio Shack HTX-404 Reports ?
>
Rich asked:
>
>>Any one use the HTX-404 UHF handy that would like to offer some comments to
>>the net ?

Paul writes:

>Yes, I own one (202 also) and I do like them alot actually.

I also own both and like them.

Paul writes:

>but I have heard (don't
>know this to be accurate however) that some of the older Icom type batteries
>may work on it. I have not been able to prove that. Maybe someone else on
>the list knows for sure.

I only use ICOM and compatible battery packs on mine. The R/S ones sit on the
self for emergencies. Note that at 35ma (25ma with power saver) this guys
use about 1/6 the power on receive that any of my icom rigs use.

Paul writes:

>They both do real FM as well, which may be important to you if you're
>considering packet (I'm not a packateer so it doesn't matter to me).

That's one of my problems. I like the sound and feel of the HTX 202 but I have
a packet setup built around it. I'll probably have to buy another one.

Rich asked:

>>Can it transmit 430-440 as well ?

Yes, it's a keyboard mod that is documented in the manual.

Paul writes:

>Why the devil would you want to do that? I hope its not for possible
>simplex use! There are weak-signal guys, satellite up/downlinks, EME
>activity, etc, down there and they don't need FM or rackety packet types
>down there to screw them up. The answer is, I don't know; but I hope
>its NO!

What about using it overseas. The uhf band in most of the world is 430-440.
By adding a key and a resistor it can be used as an uplink for satalite
work. And their is an satelite that will work with FM. (Don't ask me
which one it is though).

73

Geoff.

--
Geoffrey S. Mendelson N3OWJ
(215) 242-8712
gsm@mendelson.com   or uunet!gsm001!gsm

Date: Fri, 10 Sep 93 21:14:43 GMT
From: tribune.usask.ca!kakwa.ucs.ualberta.ca!alberta!adec23!mark@decwrl.dec.com
Subject: RFC: Re: Daily Solar Geophysical Data Broadcast for 07 September
To: info-hams@ucsd.edu

Cc: oler@rho.uleth.CA rra-wg@amdahl.com

oler@rho.uleth.CA (Cary Oler) writes:

>!!BEGIN!! (1.0) S.T.D. Solar Geophysical Data Broadcast for DAY 250, 09/07/93

These bulletins are no different than the (PKT) Geophysical Report bulletins

posted to rec.radio.info at the moment (The Packet ones add what some would
call superfluous packet headers). I would like to request comments from
interested individuals as to what to do with these bulletins in our
new rec.radio.amateur.* heirarchy.

I propose to cross-post the bulletins already posted to rec.radio.info
with the (PKT) Geophysical reports subject line (These are the shortened
information bulletins, the more verbose versions will remain in
rec.radio.info) to the rec.radio.amateur.space newsgroup. And, to request that
the current solar reports posted to rec.radio.amateur.misc cease.

However, I forsee the following areas where there may be resistance to
my proposal:
  1) rec.radio.amateur.space participants are *not* interested in
     hosting these reports, as it may drown out the discussion
     environment that seems to be forming within that group.
  2) rec.radio.amateur.misc participants, which include many of the
     listserver participants, may wish to keep on viewing these
     reports.

To #1, I currently cross-post several other bulletins to
rec.radio.amateur.space, and have only received ONE complaint so far. I
suspect that the fact the bulletins are cross-posted reduces the number of
actually viewed bulletins in that group (through the news-reading softwares
handling of cross-posted news) and my guess is perhaps that the solar
reports will not have a major impact and can be filtered effectively
by the tools outlined in the rec.radio.info FAQs as well if desired.

To #2, the proposal could be modified to include cross-posting to
rec.radio.amateur.misc, keeping the bulletins there, and garnering the
benefits of reducing new bandwidth by utilizing the cross-posting
mechanism.

Status Quo, I feel, is unacceptable, as I will begin making efforts to
switch over to cross-posting the bulletins to at least rec.radio.amateur.misc
and asking Cary to cease sending the bulletins to info-hams@ucsd.edu as
a minimum.

Now, what to do with the solar reports in rec.radio.shortwave ... :-)
<as he feels the power surging under his fingertips and the accompanying>
<rush of corruption!   :-)   >

Ciao, 73 de VE6MGS/Mark -sk-

Date: Sun, 12 Sep 1993 19:22:00 GMT
From: swrinde!cs.utexas.edu!utnut!torn!newshost.uwo.ca!gaul.csd.uwo.ca!

jsmith@network.ucsd.edu
Subject: transmitter health hazards
To: info-hams@ucsd.edu

Could someone please tell me what health hazards, if any, are associated
with having a 20kw transmitter close to your property? Thanks for
any help.
                John

Date: Fri, 10 Sep 93 12:38:00 -0600
From: swrinde!menudo.uh.edu!nuchat!cld9!dave.santoro@network.ucsd.edu
Subject: TS450S for Sale
To: info-hams@ucsd.edu

FOR SALE

* Kenwood TS-450S HF Transciever
    10-160 meters
    500khz - 30 Mhz RX
    100 Watts
    MINT condition - 3 months old - used for receiving only.
    In Box, all manuals, schematics, etc..

* Astron RS-35A Power Supply
    12V, 35 Amps
    Grey Case
    MINT condition

* VCI VC300DLP Antenna Tuner
    Built in SWR Meter (backlit when connected to power supply)
    Built in Dummy Load
    Handles up to 300 Watts
    Mint Condition
    In Box, all manuals, schematics, etc..

ALL THREE $1200 Negotiable

North-Central New Jersey
You pick up or pay shipping
call (212)742-8170 Days, ask for Dave

----
73   David H. Santoro
                 N2VYP

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--------------------------------------------------------
73          David H. Santoro
                  N2VYP
--------------------------------------------------------
%T, %D


---
 * CmpQwk #UNREG * UNREGISTERED EVALUATION COPY
 * R109U:* Usenet * Nitelog BBS * Monterey CA * 408-655-1096


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Date: 11 Sep 93 08:36:35 -0600
From: swrinde!sdd.hp.com!saimiri.primate.wisc.edu!nntp.msstate.edu!nntp.memst.edu!
kenastonmr@network.ucsd.edu
Subject: University Amateur Radio Club Net
To: info-hams@ucsd.edu

In article <9309101601.AA11443@ucsd.edu>, ST1860@SIUCVMB.SIU.EDU (Gary R. Smith
KE9MI) writes:
> ...I am more than willing to act as Net
> control until a regular pattern gets established......This might be a good oppu
> rtunity for these clubs to establish contact something that doesn't seem to hap
> pen on any type of regular basis....Thanx & 73s...Gary KE9MI Southern Illinois
> University Amateur Radio Club W9UIH.......
>
The ARC at Memphis State University has participated in past nets and
would like to participate in any future nets, time and frequency permitting.

Monte


Monte R. Kenaston, N7NJY        Bitnet:     kenastonmr@memstvx1
Department of Anthropology      Internet:   kenastonmr@memstvx1.memst.edu
Memphis State University        Phone:      901-678-3328
Memphis, TN 38152               Fax:        901-678-2069


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Date: Sun, 12 Sep 1993 13:32:46 GMT
From: library.ucla.edu!agate!howland.reston.ans.net!sol.ctr.columbia.edu!emory!
kd4nc!ke4zv!gary@network.ucsd.edu
To: info-hams@ucsd.edu

References <26jnim$43k@news.delphi.com>, <1993Sep8.094751.29146@ke4zv.atl.ga.us>,
<1209@pig.UUCP>~
```

Reply-To : gary@ke4zv.UUCP (Gary Coffman)
Subject : Re: Is 8 DSP enough for HF CW ?

In article <1209@pig.UUCP> jjmhome!pig!die@transfer.stratus.com writes:
>
>   Both of these measurements are of energy over the whole 200-3000
>communications audio bandwidth. And indeed few SSB receivers will do
>much better than 45-50 db or so measured this way. *But* and this is an
>important but, this is total energy over 200-3000 hz or so. But actual
>CW (A1) (Morris, which I hate) signals occupy something around 50 to 100
>hz useful bandwidth for the carrier and sidebands at something around
>400-800 hz depending on operator preference.
>
>   What this all means is what is relevant is the energy in the 100
>hz (roughly the bandwidth of the ear when listening to CW) at around say
>600 hz coming out of the receiver. If we assume flat white noise (equal
>amplitude per hertz) and a 2700 hz IF filter noise bandwidth, this is
>100/2700 of the noise power measured in the full bandwidth. or 14.3 db
>less noise than the measured -50 db. But 60 and 120/180 hz hum and
>various other non white or non broadband noise components may make up a
>significant part of the noise energy in that -50 db, so the the actual
>white true noise energy SNR in a 100 hz CW bandwidth at the CW note
>frequency may be more like -60 or 65 or more db in some good receivers.

Don't confuse S/N with dynamic range. They're expressed in the same
units, but they aren't the same thing. The point is that the product
detectors and audio stages of commercial amateur receivers don't
have a large dynamic range *because they don't have to*, and it
costs a few dollars per unit to add this unnecessary ability.
So regardless of the possible S/N improvement you could theoretically
get by narrow filtering of the audio, you don't have the dynamic
range in the incoming signal to the DSP to allow you to do it.
If you use a DC receiver with a very high dynamic range mixer,
well then it may be a different story. But then you have the alias
component you can't remove. If you try a phasing detector to remove
that component, you can't build one that has more than about 40-50
db of suppression, so you're back in the same boat.

Look, I'm assuming ordinary commercial amateur radios with ordinary
audio DSP boxes that plug into the radio. That's the amateur reality.
If we design a special receiver, and feed it into a special DSP,
results can be somewhat better. However, SOTA in commercial analog
audio is only approaching 90 db in the very best designs. That's
why CDs don't sound much better than good analog sources. The
digits can do it, but the analog amplifier stages can't. And it's
all moot anyway with speakers with 3-5% distortion and SPL ranges
from the 62 db SPL of a quiet room to the 120-130 db SPL of the
threshold of pain. Dynamic range just doesn't need to exceed

about 60-70 db. In comm receivers, it rarely needs to exceed
20-30 db, so those stages are rarely designed to do better than
that.

Gary
--
Gary Coffman KE4ZV |"If 10% is good enough | gatech!wa4mei!ke4zv!gary
Destructive Testing Systems | for Jesus, it's good | uunet!rsiatl!ke4zv!gary
534 Shannon Way | enough for Uncle Sam."| emory!kd4nc!ke4zv!gary
Lawrenceville, GA 30244 | -Ray Stevens |

----

n4hy@tang.ccr-p.ida.org (Bob McGwier) writes:

>No but are you really suggesting that there is a useful signal at the
>.00000005 V level in there? Then if not, why do I need 90+ dB dynamic
>range in my A/D if I have plenty of dynamic range in my processor to
>do the algorithm adequately.

>Robert W. McGwier | n4hy@ccr-p.ida.org

Bob, first let me apologize for the communication I sent directly to you.
Your "help" caught me at a very bad time.

I am running some tests on my ICOM-725 which I will report on here when
I am finished. I sincerely believe that you can get a 5 volt peak-to-
peak and a 5 mV peak-to-peak at the same time out of an audio amplifier.
Note, it's milivolts, not microvolts. I have compared 8-bit A/Ds and 16-
bit A/Ds side by side and the 16-bit is aurally superior with the same
algorithms.

I suspect that the speced audio dynamic range is a minimum guaranteed
value based on SSB operation. When one is operating CW with the AGC
off, the audio gain at maximum, and the audio level manually controlled
using the RF gain control, could be the dynamic range is higher.

Looks like you are willing to admit that a 16-bit system introduces 48db
less quantization noise than an 8-bit system. Even if I am wrong about

the dynamic range of a receiver audio, why deliberately introduce noise
when, for the same price you can buy a 16-bit system instead of an 8-bit
system? And I know that you know that a sigma-delta system reduces the
noise that you can hear even further than an equal-bit successive
approximation A/D assuming over-sampling in the s-d system and not in the
s-a system which is normal practice.

Just want to point out that if you believe that there is no 5 microvolt
signal buried in the noise, you will never find it even if it's there.
There just might be a pony in that pile.

73, Cecil, KG7BK

Date: Sun, 12 Sep 1993 13:03:16 GMT
From: library.ucla.edu!agate!howland.reston.ans.net!darwin.sura.net!emory!kd4nc!
ke4zv!gary@network.ucsd.edu
To: info-hams@ucsd.edu

References <26jnim$43k@news.delphi.com>, <1993Sep8.094751.29146@ke4zv.atl.ga.us>,
<26naii$kac@news.delphi.com>
Reply-To : gary@ke4zv.UUCP (Gary Coffman)
Subject : Re: W9GR DSP KIT ??

In article <26naii$kac@news.delphi.com> cecilmoo@news.delphi.com
(CECILMOORE@DELPHI.COM) writes:
>gary@ke4zv.atl.ga.us (Gary Coffman) writes:
>
>>Ahem, are you seriously saying that there are commercial receivers
>>on the market that exhibit more than 50 db of dynamic range on their
>>audio outputs?...
>
>Of course they do, just not into an 8-ohm speaker. Ahem, are you
>seriously saying that I should digitize the distorted audio signal
>that appears across my speaker terminals? I'm taking the CW audio
>out of my receiver, routing it to an active filter with an input
>impedence of megohms, and processing it with DSP techniques that
>allow my PC to display the characters. I'm not using a speaker at all.
>
>Say the loudest signal is 5 volts. Do you think there might be a
>500 mV signal lurking in there somewhere? How about 50 mV? Just
>because you can't hear it, don't assume it's not there. My DSP
>processor has copied AMTOR when I can't hear anything but noise.

The relevant thing about the speaker is that it's the design load
of the receiver audio output stage. These are large signal amplifiers
which are rarely operated class A. The typical maximum spec is 3 watts

output at 10% THD. Now that's a 4.89 volt signal with 10% distortion,
or a 4.4 volt signal with .49 volt distortion products. So, no I don't
expect a 5 volt undistorted signal. I would expect that a 500mV signal,
18.88 db down, would be there, and probably with no more than 1% distortion.
A 50mV signal would be 38.89 db down and likely present too. But much
below that I'd expect the signal to be lost in the receiver generated
noise and in the non-linear range of the output amplifier due to
crossover distortion et al. If you pick up the signal at the top of the
volume control, after the preamp but before the power amp, your dynamic
range could be somewhat better, though you'd be working with about 30 db
less signal. In fact, it's unusual to find a product detector with a
linear range exceeding 50 db in commercial amateur receivers.

>>AGC or MGC *must* be used to prevent overloading receivers...
>
>Of course, it's the AGC being controlled by the strong, unwanted
>signal that is part of the problem. If it weren't for that strong
>signal, the AGC would back off and let me copy the signal in which
>I am interested.

Yes, by controlling the level of the signal of interest to fall within
the dynamic range of the receiver detector and audio output stages.

>>That gain control at IF will push your weak signal below the
>>receiver noise floor...
>
>It certainly will for some signals. But the AGC is also acting to
>push the atmospheric noise level down, so, in a way, that strong,
>unwanted signal is doing us a favor by reducing the considerable
>QRN on 40 meters. Some signals exist above the noise level but can't
>be heard by our human ears because of the strong interfering signal.

Perhaps, but receiver gain distribution is done in such a way as to
distribute the receiver's internal noise generation so that a normal
signal will override it sufficiently to maintain a reasonable S/N
when gain control is active. Most receivers operate with an internal
noise level just below that of atmospheric for HF receivers. When
you decrease incoming signal levels by reducing RF and IF gain, you
wind up with a signal that can no longer override the internally
generated noise and distortion of the detector and AF stages. They
aren't designed for ultimate S/N or dynamic range because they
don't have to be. They follow gain controlled stages that set the
S/N and dynamic range of the receiver for them.

>>I think you're expecting too much from audio DSP...

>That reminds me of my college professor who told me one watt on 80
>meters was too much ever to expect from a transistor... the year was

>1958. I am working with a system that sends and receives uncompressed
>data at 28800 bits per second over ordinary telephone lines. I don't
>think it's too much to ask for that same system to notch out a super
>strong heterodyne, reduce the uncorrelated noise, notch out the
>correlated noise that's wider than a Morse Code dash and filter/peak/
>decode the CW signal of the ham with whom I want to communicate. Can
>you imagine giving out a 500 RST?

Ask yourself what is the dynamic range of the POTS.

>(I admit that anyone who would use state of the art DSP systems
>to copy an obsolete means of communications must be slightly bonkers.)

To maximize the utility of audio DSP, you need a receiver that has
a high dynamic range without gain control, and one that uses stages
which are ultralinear and that have had considerable attention paid
in order to optimize the S/N of each stage. Ordinary commercial ham
receivers aren't this way. They attempt to set receiver S/N by paying
attention to the first couple of stages. They are designed to work with
less than 50 db of dynamic range at the speaker output. That's done
mainly through an AGC system that constrains output to the detector
and post detector stages to a very small dynamic range, often on the
order of 2 db for a 20 db signal level change. That's perfectly fine
when dealing with communications quality audio intended for human ears
through a speaker. But it's not at all satisfactory for the usage you
envision.

To get 90 db of dynamic range, the receiver's audio stages must
work linearly over a range of roughly 32,000:1. That's barely
approachable by the very best HiFi equipment, the so called
"digital compatable" systems. And even they don't really expect
to reproduce the low end of the dynamic range because no one can
hear it due to the nominal 62 db SPL of an ordinary room. You
certainly won't find that in any commercial amateur receiver.
Some homebrew DC designs can come close, but then you have an
unfilterable image that aliases into your output. Even DSP can't
deal with that.

Gary
--
Gary Coffman KE4ZV |"If 10% is good enough | gatech!wa4mei!ke4zv!gary
Destructive Testing Systems | for Jesus, it's good | uunet!rsiatl!ke4zv!gary
534 Shannon Way | enough for Uncle Sam."| emory!kd4nc!ke4zv!gary
Lawrenceville, GA 30244 | -Ray Stevens |

Date: 10 Sep 1993 23:03:04 -0400

die@pig.UUCP (Dave Emery) writes:
>   Thus the experiance of those who have tried to use 8 bit A/Ds
>in DSP based filters for ham hf cw is quite consistant with theory.

Thanks, Dave, I needed that. I first tried 8-bit A/Ds and then 10-bit
A/Ds. I was not even happy with the 10-bit performance. So went to
a 16-bit sigma-delta system with a two-stage front end filter and
now I'm happy with the hardware.

73, Cecil, KG7BK

End of Info-Hams Digest V93 #1084
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